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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/814,615	03/31/2004	Andrew W. Dornbusch	1052-0010	5474

34456 7590 05/14/2007

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BAYARD, EMMANUEL	
ART UNIT	**PAPER NUMBER**
2611	

MAIL DATE	DELIVERY MODE
05/14/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/814,615	DORNBUSCH, ANDREW W.	
	Examiner	Art Unit	
	Emmanuel Bayard	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *31 March 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-38* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5,7-26 and 28-38* is/are rejected.

7)☒ Claim(s) *6 and 27* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 22 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

3. Claim 22 recites the limitation "the image rejecting mixer" in line 1. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-3 and 16-18 are rejected under 35 U.S.C. 102(e) as being anticipated by Lopez-Estrada U.S. Pub No 2003/0052300 A1.

As per claim 1, Lopez-Estrada teaches a polyphase filter comprising: a first filter section having an input for receiving signals (see fig.10 element 1020 and page 4 paragraph [0065] representative of a complex signals (see page 1 [0021]. Note that

complex signals are known in the art as in-phase and quadrature signals or real and imaginary signals having multiple phases or polarities) are the same as the claimed (at least two phases of an input signal), and an output for providing signals representative of at least two phases of a filtered signal, said first filter section having a first pass band response (see page 4 [0058-0059]); a buffer section having an input coupled to said output of said first filter section, and an output (see fig.10 element 1030 and page 4 [0063-0067]); and a second filter section having an input coupled to said output of said buffer section, and an output for providing an output of the polyphase filter, said second filter section having a second pass band response (see fig.10 element 1040 and page 4 [0059, 0066]); wherein said first and second filter sections are configured such that said second pass band response compensates for said first pass band response (see page 4 [0059]-0062).

As per claim 2, Lopez-Estrada teaches wherein an overall pass band response of the polyphase filter is characterized as being substantially flat (see page 3 [0042-0043]).

As per claim 3, Lopez-Estrada teaches wherein a first one of said first and second filter sections has at least one polyphase filter stage, and a second one of said first and second filter sections has at least two polyphase filter stages (see figs.4, 6, 8 and 10).

As per claim 16, Lopez-Estrada teaches a method for filtering an input signal to provide a filtered signal comprising the steps of: forming signals representative of at least two phases of the input signal; filtering said signals in a polyphase filter having first

and second filter sections (see figs. 8-10 elements 810, 820, 920, 930, 1020, 1040) having respective first and second pass band responses, wherein said first section has an input for receiving said signals and an output, and said second section has an input coupled to an output of said first section and an output (see figs. 8-10 elements 810, 820, 920, 930, 1020, 1040) ; configuring said first and second filter sections such that said second pass band response compensates for said first pass band response (see (see page 4 [0059]-0062); and providing said output of said second filter section as the filtered signal (see figs. 8-10 elements 810, 820, 920, 930, 1020, 1040).

As per claim 17, Lopez-Estrada inherently teaches wherein said step of configuring comprises the steps of: forming a first one of said first and second filter sections with at least one stage, and forming a second one of said first and second filter sections with at least two stages.

As per claim 18, Lopez-Estrada teaches wherein said step of filtering comprises the step of buffering said output of said first section to provide said input of said second section (see fig.10 element 1030 and page 4 [0063-0067]).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 4-5, 7-9 and 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lopez-Estrada U.S. Pub No 2003/0052300 A1 in view of Yang U.S. Pub No 20050175132 A1.

As per claims 4 and 19-20 Lopez-Estrada teaches all the features of the claimed invention except wherein said signals representative of at least two phases of said input signal comprise a positive in-phase input signal, a negative in-phase input signal, a positive quadrature input signal, and a negative quadrature input signal, and wherein said signals representative of at least two phases of said filtered signal comprise a positive in-phase filtered signal, a negative in-phase filtered signal, a positive quadrature filtered signal, and a negative quadrature filtered signal.

Yang teaches wherein said signals representative of at least two phases of said input signal comprise a positive in-phase input signal, a negative in-phase input signal, a positive quadrature input signal, and a negative quadrature input signal, and wherein said signals representative of at least two phases of said filtered signal comprise a positive in-phase filtered signal, a negative in-phase filtered signal, a positive quadrature filtered signal, and a negative quadrature filtered signal (see fig.4, 6, 9 and page2 [0026-0028]).

It would have been obvious to one of ordinary skill in the art to implement the teaching of Yang into Lopez-Estrada as to toggle the frequency sign of the input signal in order to allow the polyphase filters to act as a stop band at a particular frequency as taught by Yang (see pages 2-3 [0028-0029]).

As per claim 5, Yang teaches wherein said first one of said first and second filter

sections comprises: a first resistor having a first terminal for receiving said positive in-phase input signal, and a second terminal for providing said positive in-phase filtered signal (see fig.6); a second resistor having a first terminal for receiving said positive quadrature input signal, and a second terminal for providing said positive quadrature filtered signal (see fig.6); a third resistor having a first terminal for receiving said negative in-phase input signal, and a second terminal for providing said negative in-phase filtered signal (see fig.6); a fourth resistor having a first terminal for receiving said negative quadrature input signal, and a second terminal for providing said negative quadrature filtered signal (see fig.6); a first capacitor having a first terminal coupled to said first terminal of said first resistor, and a second terminal coupled to said second terminal of said second resistor; a second capacitor having a first terminal coupled to said first terminal of said second resistor, and a second terminal coupled to said second terminal of said third resistor (see fig.6); a third capacitor having a first terminal coupled to said first terminal of said third resistor, and a second terminal coupled to said second terminal of said fourth resistor (see fig.6); and a fourth capacitor having a first terminal coupled to said first terminal of said fourth resistor, and a second terminal coupled to said second terminal of said first resistor (see fig.6 and page 3 [0032]). Furthermore implementing such teaching into Lopez-Estrada would have been obvious to one skilled in the art as to toggle the frequency sign of the input signal in order to allow the polyphase filters to act as a stop band at a particular frequency as taught by Yang (see pages 2-3 [0028-0029, 0032]).

As per claim 7, Yang teaches wherein said second one of said first and second

filter sections comprises a plurality of stages, each stage comprising: a first resistor having a first terminal for receiving a positive in-phase input signal, and a second terminal for providing a positive in-phase filtered signal (see fig.6 and page 3 [0032]); a second resistor having a first terminal for receiving a positive quadrature input signal, and a second terminal for providing a positive quadrature filtered signal (see fig.6 and page 3 [0032]); a third resistor having a first terminal for receiving a negative in-phase input signal, and a second terminal for providing a negative in-phase filtered signal; a fourth resistor having a first terminal for receiving a negative quadrature input signal, and a second terminal for providing a negative quadrature filtered signal (see fig.6 and page 3 [0032]); a first capacitor having a first terminal coupled to said first terminal of said first resistor, and a second terminal coupled to said second terminal of said second resistor; a second capacitor having a first terminal coupled to said first terminal of said second resistor, and a second terminal coupled to said second terminal of said third resistor (see fig.6 and page 3 [0032]); a third capacitor having a first terminal coupled to said first terminal of said third resistor, and a second terminal coupled to said second terminal of said fourth resistor (see fig.6 and page 3 [0032]); and a fourth capacitor having a first terminal coupled to said first terminal of said fourth resistor, and a second terminal coupled to said second terminal of said first resistor (see fig.6 and page 3 [0032]). Furthermore implementing such teaching into Lopez-Estrada would have been obvious to one skilled in the art as to toggle the frequency sign of the input signal in order to allow the polyphase filters to act as a stop band at a particular frequency as taught by Yang (see pages 2-3 [0028-0029, 0032]).

As per claim 8, Lopez and Yang in combination would teach wherein resistances said first, second, third, and fourth resistors of a first one of said plurality of stages are related to corresponding resistances of said first, second, third, and fourth resistors of a second one of said plurality of stages by a predetermined ratio as to toggle the frequency sign of the input signal in order to allow the polyphase filters to act as a stop band at a particular frequency as taught by Yang (see pages 2-3 [0028-0029, 0032]).

As per claim 9, Lopez and Yang in combination would teach wherein said predetermined ratio is about 1:2.5 as to toggle the frequency sign of the input signal in order to allow the polyphase filters to act as a stop band at a particular frequency as taught by Yang (see pages 2-3 [0028-0029, 0032]).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 10-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yang U.S. Pub No 20050175132 A1 in view of Lopez-Estrada U.S. Pub No 2003/0052300 A1.

As per claim 10, Yang teaches polyphase filter comprising: at least three polyphase filter stages wherein a first polyphase filter stage has an input for receiving an input signal, and a last polyphase filter stage has an output for providing a filtered signal (see figs.4, 9 and 11 elements 404, 904, 1104); each polyphase filter stage

except said first polyphase filter stage having an input coupled to an output of a preceding polyphase filter stage (see figs.4, 9 and 11 element3 404, 904, 1104; each polyphase filter stage except said last polyphase filter stage having an output coupled to an input of a succeeding polyphase filter stage (see figs.4, 9 and 11 element3 404, 904, 1104).

However Yang does not teach wherein one of said at least three polyphase filter stages is coupled to another one of said at least three polyphase filter stages by means of a buffer.

Lopez-Estrada teaches teach wherein one of said at least two polyphase filter stages is coupled to another one of said at least two polyphase filter stages by means of a buffer (see fig.10 element 1030 and page 4 [0063-0070]). Furthermore implementing the buffer of Lopez into the three polyphase filter stages of Yang would have been obvious to one skilled in the art as to store information from the previous polyphase and keep interpolated samples from the first stage to generate the required number of output samples as taught by Lopez (see page 4 [0066]).

As per claim 11, Lopez –Estrada teaches wherein an overall pass band response of the polyphase filter is characterized as being substantially flat (see page 3 [0042-0043]). Furthermore implementing the teaching of Lopez into the three polyphase filter stages of Yang would have been obvious to one skilled in the art as to meet the signal to noise ratio requirement as taught by Lopez (see page 3 [0044]).

As per claim 12, Lopez –Estrada teaches wherein said first polyphase filter stage is coupled to a second polyphase filter stage by means of said buffer (see fig.10

element 1030 and page 4 [0063-0070]). Furthermore implementing the buffer of Lopez into the three polyphase filter stages of Yang would have been obvious to one skilled in the art as to store information from the previous polyphase and keep interpolated samples from the first stage to generate the required number of output samples as taught by Lopez (see page 4 [0066]).

As per claim 13, Yang and Lopez Estrada in combination would teach wherein a next to last polyphase filter stage is coupled to said last polyphase filter stage by means of said buffer as to store information from the previous polyphase and keep interpolated samples from the next to last stage to generate the required number of output samples as taught by Lopez (see page 4 [0066]).

As per claim 14, Yang and Lopez Estrada in combination would teach wherein said first polyphase filter stage is characterized as being a passive polyphase filter stage as to filter one of the unwanted harmonic frequency components.

As per claim 15, Yang teaches wherein said first polyphase filter stage comprises: a first resistor having a first terminal for receiving said positive in-phase input signal, and a second terminal for providing said positive in-phase filtered signal(see fig.6 and page 3 [0032]); a second resistor having a first terminal for receiving said positive quadrature input signal, and a second terminal for providing said positive quadrature filtered signal(see fig.6 and page 3 [0032]; a third resistor having a first terminal for receiving said negative in-phase input signal, and a second terminal for providing said negative in-phase filtered signal (see fig.6 and page 3 [0032]; a fourth resistor having a first terminal for receiving said negative quadrature input signal, and a second terminal

for providing said negative quadrature filtered signal (see fig.6 and page 3 [0032]; a first capacitor having a first terminal coupled to said first terminal of said first resistor, and a second terminal coupled to said second terminal of said second resistor (see fig.6 and page 3 [0032]); a second capacitor having a first terminal coupled to said first terminal of said second resistor, and a second terminal coupled to said second terminal of said third resistor(see fig.6 and page 3 [0032]); a third capacitor having a first terminal coupled to said first terminal of said third resistor, and a second terminal coupled to said second terminal of said fourth resistor(see fig.6 and page 3 [0032]); and a fourth capacitor having a first terminal coupled to said first terminal of said fourth resistor, and a second terminal coupled to said second terminal of said first resistor(see fig.6 and page 3 [0032]).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 21-24 and 31-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Song U.S. Patent No 6,049,573 in view of Lopez-Estrada U.S. Pub No 2003/0052300 A1.

As per claim 21, Song teaches an image rejecting mixer comprising: a first multiplier having a first input for receiving an input signal (see fig.3 element 106), a

second input for receiving a cosine signal is the same as the claimed (first local oscillator signal) (see fig.3 and col.2, lines 25—27), and an output; a second multiplier having a first input for receiving said input signal (see fig.3 element 108), a second input for receiving a sine signal is the same as the claimed (second local oscillator signal) in quadrature with said first local oscillator signal (see fig.3 and col.2, lines 25-27), and an output; and a polyphase filter having first and second inputs respectively coupled to said outputs of said first and second multipliers, and an output for providing an output of the image rejecting mixer (see figs. 2-3 elements 204 and col.2, lines 37-63); a polyphase filter comprising: a first filter section having first and second inputs respectively coupled to said outputs of said first and second multipliers, and an output for providing signals representative of at least two phases of a filtered signal, said first filter section having a first pass band response (see figs. 2-3 elements 204 and col.2, lines 37-63).

However Song does not teach a polyphase filter comprising; a buffer section having an input coupled to said output of said first filter section, and an output; and a second filter section having an input coupled to said output of said buffer section, and an output for providing an output of the polyphase filter, said second filter section having a second pass band response; wherein said first and second filter sections are configured such that said second pass band response compensates for said first pass band response.

Lopez-Estrada teaches a polyphase filter comprising: a first filter section having an input for receiving signals (see fig.10 element 1020 and page 4 paragraph [0065] representative of a complex signals (see page 1 [0021]. Note that complex signals are known in the art as in-phase and quadrature signals or real and imaginary signals having multiple phases or polarities) are the same as the claimed (at least two phases of an input signal), and an output for providing signals representative of at least two phases of a filtered signal, said first filter section having a first pass band response (see page 4 [0058-0059]); a buffer section having an input coupled to said output of said first filter section, and an output (see fig.10 element 1030 and page 4 [0063-0067]); and a second filter section having an input coupled to said output of said buffer section, and an output for providing an output of the polyphase filter, said second filter section having a second pass band response (see fig.10 element 1040 and page 4 [0059, 0066]); wherein said first and second filter sections are configured such that said second pass band response compensates for said first pass band response (see page 4 [0059]-0062).

It would have been obvious to one of ordinary skill in the art to implement the teaching of Lopez-Estrada into Song as to store information from the previous polyphase and keep interpolated samples from the first stage to generate the required number of output samples as taught by Lopez (see page 4 [0066]).

As per claim 22, Lopez –Estrada teaches wherein an overall pass band response of the polyphase filter is characterized as being substantially flat (see page 3 [0042-0043]). Furthermore implementing the teaching of Lopez into Song would have

been obvious to one skilled in the art as to meet the signal to noise ratio requirement as taught by Lopez (see page 3 [0044]).

As per claim 23, Song and Lopez in combination would teach wherein a first one of said first and second filter sections has at least one polyphase filter stage, and a second one of said first and second filter sections has at least two polyphase filter stages as to accurately reduce distortion in the previous filtered signal.

As per claim 24, Song and Lopez in combination would teach wherein said first one of said first and second filter sections comprises said first filter section, and said second one of said first and second filter sections comprises said second filter section as to accurately reduce distortion in the previous filtered signal.

As per claim 31, Song teaches a local oscillator having a first output for providing said first local oscillator signal, and a second output for providing said second local oscillator signal (see fig.3 elements cos and sin).

As per claim 32, Song teaches wherein said first and second local oscillator signals have a predetermined frequency chosen to mix said input signal to baseband (see fig.3 element 106 or 108).

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10. Claims 25-26, 28-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Song U.S. Patent No 6,049,573 in view of Lopez-Estrada U.S. Pub No 2003/0052300 A1 and in further view of Yang U.S. Pub No 20050175132 A1.

As per claim 25, Song and Lopez in combination teaches all the features of the claimed invention except wherein said input of said first filter section comprises a positive in-phase input signal, a negative in-phase input signal, a positive quadrature input signal, and a negative quadrature input signal, said output of said first filter section comprises a positive in-phase filtered signal, a negative in-phase filtered signal, a positive quadrature filtered signal, and a negative quadrature filtered signal.

Yang teaches wherein said input of said first filter section comprises a positive in-phase input signal, a negative in-phase input signal, a positive quadrature input signal, and a negative quadrature input signal, said output of said first filter section comprises a positive in-phase filtered signal, a negative in-phase filtered signal, a positive quadrature filtered signal, and a negative quadrature filtered signal(see fig.4, 6, 9 and page2 [0026-0028]).

It would have been obvious to one of ordinary skill in the art to implement the teaching of Yang into Song and Lopez-Estrada as to toggle the frequency sign of the input signal in order to allow the polyphase filters to act as a stop band at a particular frequency as taught by Yang (see pages 2-3 [0028-0029]).

As per claim 26, Yang teaches wherein said first one of said first and second filter sections comprises: a first resistor having a first terminal for receiving said positive in-phase input signal, and a second terminal for providing said positive in-phase filtered

signal (see fig.6 and page 3 [0032]); a second resistor having a first terminal for receiving said positive quadrature input signal, and a second terminal for providing said positive quadrature filtered signal (see fig.6 and page 3 [0032]); a third resistor having a first terminal for receiving said negative in-phase input signal, and a second terminal for providing said negative in-phase filtered signal (see fig.6 and page 3 [0032]); a fourth resistor having a first terminal for receiving said negative quadrature input signal, and a second terminal for providing said negative quadrature filtered signal (see fig.6 and page 3 [0032]); a first capacitor having a first terminal coupled to said first terminal of said first resistor, and a second terminal coupled to said second terminal of said second resistor; a second capacitor having a first terminal coupled to said first terminal of said second resistor, and a second terminal coupled to said second terminal of said third resistor (see fig.6 and page 3 [0032]); a third capacitor having a first terminal coupled to said first terminal of said third resistor, and a second terminal coupled to said second terminal of said fourth resistor (see fig.6 and page 3 [0032]); and a fourth capacitor having a first terminal coupled to said first terminal of said fourth resistor, and a second terminal coupled to said second terminal of said first resistor (see fig.6 and page 3 [0032]). Furthermore implementing such teaching into Song and Lopez-Estrada would have been obvious to one skilled in the art as to toggle the frequency sign of the input signal in order to allow the polyphase filters to act as a stop band at a particular frequency as taught by Yang (see pages 2-3 [0028-0029, 0032]).

As per claim 28, Yang teaches wherein said second one of said first and second filter sections comprises a plurality of stages, each stage comprising: a first resistor

having a first terminal for receiving a positive in-phase input signal, and a second terminal for providing a positive in-phase filtered signal (see fig.6 and page 3 [0032]); a second resistor having a first terminal for receiving a positive quadrature input signal, and a second terminal for providing a positive quadrature filtered signal (see fig.6 and page 3 [0032]); a third resistor having a first terminal for receiving a negative in-phase input signal, and a second terminal for providing a negative in-phase filtered signal (see fig.6 and page 3 [0032]); a fourth resistor having a first terminal for receiving a negative quadrature input signal, and a second terminal for providing a negative quadrature filtered signal (see fig.6 and page 3 [0032]); a first capacitor having a first terminal coupled to said first terminal of said first resistor, and a second terminal coupled to said second terminal of said second resistor; a second capacitor having a first terminal coupled to said first terminal of said second resistor, and a second terminal coupled to said second terminal of said third resistor (see fig.6 and page 3 [0032]); a third capacitor having a first terminal coupled to said first terminal of said third resistor, and a second terminal coupled to said second terminal of said fourth resistor; and a fourth capacitor having a first terminal coupled to said first terminal of said fourth resistor, and a second terminal coupled to said second terminal of said first resistor(see fig.6 and page 3 [0032]). Furthermore implementing such teaching into Song and Lopez-Estrada would have been obvious to one skilled in the art as to toggle the frequency sign of the input signal in order to allow the polyphase filters to act as a stop band at a particular frequency as taught by Yang (see pages 2-3 [0028-0029, 0032]).

As per claim 29, Song and Lopez and Yang in combination would teach wherein

resistances said first, second, third, and fourth resistors of a first one of said plurality of stages are related to corresponding resistances of said first, second, third, and fourth resistors of a second one of said plurality of stages by a predetermined ratio as to toggle the frequency sign of the input signal in order to allow the polyphase filters to act as a stop band at a particular frequency as taught by Yang (see pages 2-3 [0028-0029, 0032]).

As per claim 30, Song and Lopez and Yang in combination would teach wherein said predetermined ratio is about 1:2.5 as to toggle the frequency sign of the input signal in order to allow the polyphase filters to act as a stop band at a particular frequency as taught by Yang (see pages 2-3 [0028-0029, 0032]).

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

12. Claims 33- 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kanno et al U.S. Pub No 2003/0071925 A1 in view of Lopez-Estrada .

As per claim 33, Kanno teaches a receiver comprising: a first mixer having an input for receiving an RF signal (see figs. 5, 7 and 12 elements 43, 63), and an output for providing an intermediate frequency (IF) signal; a first filter having an input for receiving said IF signal, and an output for providing a filtered IF signal (see figs. 5, 7 and 12 elements 45, 65); a second mixer having an input for receiving said filtered IF

signal, and an output for providing a baseband signal (see figs. 5, 7 and 12 element 67-68); and a second filter having an input for receiving said baseband signal, and an output for providing a filtered baseband signal (see figs. 5, 7 and 12 elements 71-72); wherein said second mixer is characterized as being an image rejecting mixer and comprises: a first multiplier having a first input for receiving said filtered IF signal (see figs. 5, 7 and 12 element 67), a second input for receiving a first local oscillator signal (see figs. 5, 7 and 12 element 48 or 69), and an output; a second multiplier having a first input for receiving said filtered IF signal (see figs. 5, 7 and 12 element 68 and page 5 [0081])), a second input for receiving a second local oscillator signal in quadrature with said first local oscillator signal and an output (see figs. 5, 7 and 12 element 48 or 70 and page 5 [0081]).

However Kanno does not teach a polyphase filter comprising: a first filter section having first and second inputs respectively coupled to said outputs of said first and second multipliers, and an output for providing signals representative of at least two phases of a filtered signal, and having a first pass band response; a buffer section having an input coupled to said output of said first filter section, and an output; and a second filter section having an input coupled to said output of said buffer section, and an output for providing an output of the polyphase filter, and having a second pass band response; wherein said first and second filter sections are configured such that said second pass band response compensates for said first pass band response.

Lopez-Estrada teaches a polyphase filter comprising: a first filter section having an input for receiving signals (see fig.10 element 1020 and page 4 paragraph [0065] representative of a complex signals (see page 1 [0021]. Note that complex signals are known in the art as in-phase and quadrature signals or real and imaginary signals having multiple phases or polarities) are the same as the claimed (at least two phases of an input signal), and an output for providing signals representative of at least two phases of a filtered signal, said first filter section having a first pass band response (see page 4 [0058-0059]); a buffer section having an input coupled to said output of said first filter section, and an output (see fig.10 element 1030 and page 4 [0063-0067]); and a second filter section having an input coupled to said output of said buffer section, and an output for providing an output of the polyphase filter, said second filter section having a second pass band response (see fig.10 element 1040 and page 4 [0059, 0066]); wherein said first and second filter sections are configured such that said second pass band response compensates for said first pass band response (see page 4 [0059]-0062).

It would have been obvious to one of ordinary skill in the art to implement the teaching of Lopez-Estrada into Kanno as to store information from the previous polyphase and keep interpolated samples from the first stage to generate the required number of output samples as taught by Lopez (see page 4 [0066]).

As per claim 34, Lopez –Estrada teaches wherein an overall pass band response of the polyphase filter is characterized as being substantially flat (see page 3 [0042-0043]). Furthermore implementing the teaching of Lopez into Kanno would have

been obvious to one skilled in the art as to meet the signal to noise ratio requirement as taught by Lopez (see page 3 [0044]).

As per claim 35, Kanno and Lopez in combination would teach wherein a first one of said first and second filter sections has at least one polyphase filter stage, and a second one of said first and second filter sections has at least two polyphase filter stages as to accurately reduce distortion in the previous filtered signal.

As per claim 36, Kanno teaches wherein said first mixer mixes said RF signal to a fixed IF (see fig.5 and element 45).

As per claim 37, Kanno teaches a low noise amplifier having an input adapted to be coupled to an antenna, and an output coupled to said input of said first mixer for providing said RF signal (see figs. 5, 7 and elements 42, 62).

AS per claim 38, Kanno and Lopez in combination would teach a programmable gain amplifier coupled between said output of said second mixer and said input of said second filter as to accurately increase the gain so that all distortions could be removed in the previous filtered signal.

Allowable Subject Matter

13. Claims 6 and 27 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

14. The following is a statement of reasons for the indication of allowable subject matter: a first buffer having an input terminal for receiving said positive in-phase filtered

signal, and an output terminal; a second buffer having an input terminal for receiving said positive quadrature filtered signal, and an output terminal; a third buffer having an input terminal for receiving said negative in-phase filtered signal, and an output terminal; and a fourth buffer having an input terminal for receiving said negative quadrature filtered signal, and an output terminal as recited in claims 6 and 27.

Conclusion

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Liu U.S. Patent No 7,184,737 B2 teaches an image rejection demodulators.

Chen et al U.S. Patent No 5,610942 teaches a digital signal transcoder.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Emmanuel Bayard whose telephone number is 571 272 3016. The examiner can normally be reached on Monday-Friday (7:Am-4:30PM) Alternate Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jay Patel can be reached on 571 272 2988. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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5/9/2007

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